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Increasing Added Value of Vanilla through Technology Utilization of Registered Patent

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Abstract

Vanilla has become Indonesia's export commodities since 1969. Although it does not belong to Indonesia's indigenous plants, vanilla can be grown well in some regions of the country. Potential use of vanilla in food, cosmetics, and pharmaceuticals industry, causes value of this commodity continuously maintained. Indonesian vanilla export in the form of dried vanilla bean reaches approximately 80% of the total exports of Indonesian vanilla. However, added value of vanilla will be higher if the vanilla exported as processed product rather than dried vanilla beans. Therefore, this study aims to explore vanilla processing technology from patent documents to obtain a vanilla processing technology that can be applied in Indonesia without violating the law. Patent document searching was done through the free websites of patent documents provider such as Patentscope, freepatensonline, googlepatent, and espacenet, and the through a paid searching program such as Matheo Patent. This study use descriptive method where the data resulted from searching process were grouped into raw vanilla beans processing technology, vanilla processed product manufacturing, and vanilla waste or spent optimization of utilization. The results show some technologies that can be applied in Indonesia, which are US 2011/0081448, US 005705205, and EP 2430925. Based on the patent document searching results, added value of vanilla can be achieved through vanilla processing technologies combination of incubation technique, vanilla extract production using enzyme, and spent vanilla utilization of sing enzymes and microorganism.

Keywords: vanilla bean; patent; technology processing; added value; dissemination of knowledge.

1. Introduction

Vanilla is not originated in Indonesia, however this plant has been recorded in Research Board of Spice and Medicinal Plants as 16 crops and 14 wild relatives [1]. Vanilla has fragrant aroma that makes it used widely in food, baverage, cosmetic, and pharmaceutical industry (Muria News). Vanilla is easily found in tropical area including Indonesia. Vanilla bean does not only offer deliciousness if added in food and beverage, but also, according to Urahman [2] vanilla has some health benefits such us sharpening brain function as natural antioxidant in vanilla increasing cognitive function. Vanilla functions as anti-inflammation like ginger, but stronger. It can also maintain neuron system wellness as it optimize neuron system function. Vanilla can be also used to relieve hysterical sign, relieve stress, and resolve impotency. Vanilla aroma helps brain relaxation as characteristic fragrance from aroma functions as aromatherapy relaxing mind. In addition, vanilla helps to relieve muscle pain. For pregnant woman, vanilla helps reduce complaint in the early pregnancy. Morning sickness can be also overcome by inhaling few drops of vanilla extract.

Since 1969, vanilla has been export commodity of Indonesia. Export value of Vanilla in 1969 is 12 tons equals to 38.000 US\$, while in 2012 export value increases to

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278 tons equals to 5,387,000 US\$. Vanilla cultivation in Indonesia is supported by suitable climate and soil. In Figure 1 is a comparison between the production of vanilla per year with a total volume of export of vanilla. Vanilla can grow well in some areas. Sulawesi is one of the largest vanilla farm with total area around 11,448 Ha and production 1,288 ton. Other areas of vanilla farm are Bali, Nusa Tenggara, Java, Sumatra, Maluku, and Kalimantan [6]. However, most of vanilla product are exported in form of dried vanilla bean. Even though, added value of vanilla will be higher if exported in form of processed product such as flavor components or vanilla extract.

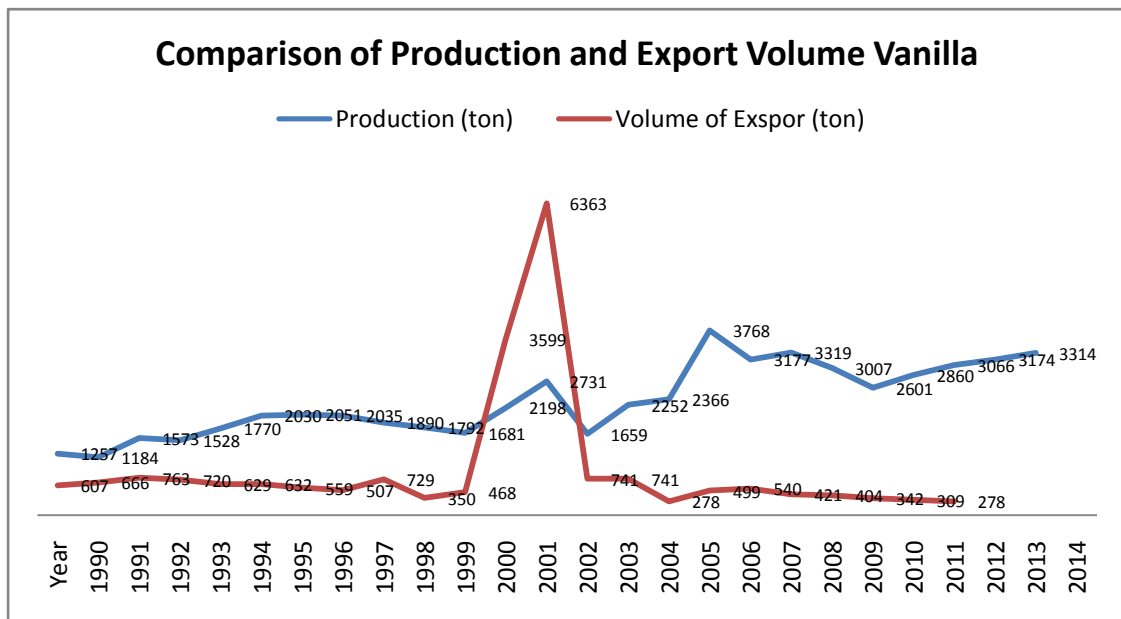


Figure 1. Comparison of Production and Export Volume of vanilla in Indonesia [6]

Technology for vanilla processing has been around for a long time. This various technology can be searched through publication such as scientific article in journal and patent document. Technology disclosed in patent document is easier to be searched and analyzed since it is well documented by IP office. Patent document is also assessed by person skilled in the art (patent examiner) to ensure the principal properties of patents is fulfilled. This properties are novelty, inventive steps, and industrial applicable [3]. Mastur [4] stated that technology protection through patent generally aims: giving clearance about relation between intellectual property and inventor, giving appreciation to effort of producing intellectual creation, promoting invention publication in form IP document open for public, stimulating technology transfer through patent, and giving protection from piracy ergo patent is a form of assurance from country that intellectual property implementation can only be done by the right holder. Beside functions as protection, patents also has limitation in time and territory. In Indonesia, patent is protected for 20 years, while simple patent is protected for 10 years [5]. Patent protection is territorial which means it only bounded to certain region where it is registered. Thus, in order to obtain patent protection in some countries, one must apply patent protection in each designated countries.

Based on the patent characteristic above, there is a big chance to explore technology disclosed in patent document. The technology can be used appropriately according to law. Technology in vanilla processing has been recorded in patent documents worldwide. Based on searching result in Indonesian IP office website, (http://e-statushki.dgip.go.id/index.php/web/search_result/10) there are two patent

documents related directly to vanilla bean processing, which are P00200600798 entitled Extraction Process of Half Dried Vanilla Fruit and P00200700617 entitled Modified Curing Method of Vanilla. It is sad that Indonesia, as one of biggest vanilla exporter country only has a tiny amount of patent in vanilla processing technology. Thus, utilization of registered patent worldwide is expected to improve processing technology of vanilla in Indonesia. Objective of this study is to explore technology related to vanilla processing through patent document to find suitable technology that can be implemented in Indonesia without violating any law. At the end, implementation of this technology is expected to increase added value of vanilla produced in Indonesia.

2. Methods

2.1. Data

Data in this study are obtained from patent searching websites whether free searching website or paid patent analyzing software. Free searching website used were google patent, WIPO patentscope, freepatentonline, and espacenet while paid software used was Matheo Patent.

2.2. Method

This study was conducted using qualitative method with descriptive data analyzing through literature study and patent searching. Literature study was carried out by searching information source relates to vanilla processing through textbook and internet. Patent documents were searched by using various keywords relates to vanilla processing technology in patent searching website and software.

3. Result and Discussion

The result from literature study and patent document searching can be explained as follow. Helmy (2008) on article titled Processing and Diversification of Vanili Based on National Quality Standard explained that vanilli bean processing consists of 1) withering 2) aging and drying 3) wind drying and 4) conditioning. The whole process can take up to 3 months long. Vanilla can be processed into oleoresin too which has some superiorities such as free of microorganism contamination, stronger aroma, and easier to mix in food processing. This processing steps of vanilla bean has been generally practiced in Indonesia. Increasing of vanilla added value can be achieved through improving vanilla bean quality, turning vanilla bean into processed product, and optimizing the use of spent vanilla. A new technology can be adopted well with the consideration of its technical difficulties, the effectiveness, and the cost, aside from social aspect. The following briefs will be highlighting each technology approximately match to be implemented by vanilla industry in Indonesia.

3.1. Vanilla Bean Processing (Curing and Drying)

Searching process using keyword such as "vanilla bean processing" and "vanilla bean drying and curing" resulting 100-150 patent documents in free searching website and searching software. Those result can be overlapping since each website and software may use the same database. However, focusing the keyword resulting some patent documents relevant to vanilla bean processing technology. According to searching result, one of the oldest technologies to improve vanilla bean processing is registered in 1942 in USA. This expired patent entitled Processing for Curing Vanilla Bean revealed a process for curing vanilla beans, which comprises subjecting them to the action of temperature that will cause the beans to freeze solidly, thereafter thawing the beans, thereafter completing the beans by known and usual method. This technology is used to achieve vanilla bean characterized by greater flexibility, a more desirable color aroma, a



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softer and less woody feel throughout the bean, especially at the stem end. The extract from the bean furthermore characterized by higher content of total phenol than is found in similar beans cured without freezing. This patent has been expired so it can be used under Freedom to Operate mechanism. However, the need of freezing and thawing process can be a burden for vanilla farmers or small producer. So, this technology suits for a bigger industry.

Other vanilla processing technology is explained in patent US3663238 filed in 1968. This document revealed a simple steps in vanilla bean drying and curing comprises chopping vanilla bean in approximately one-half inch lengths, curing for about 70-78 hours in perforated trays within a closed tank maintained at about 140°F, returned exudate to the beans, drying in a rotary forced air, hot water jacketed drier at about 140°F until reduced to about 35-40 % moisture by weight, transferring to a conditioner and drier more slowly with air at room temperature and humidity until reduced to about 20-25% moisture content by weight. This invention provides a process for drying and curing vanilla beans more quickly than old, conventional method, while preserving the beans in an easily handled form, recognizable as vanilla beans, and improving the quality and quantity of vanillin and other desired flavoring material recoverable from the dried and cured beans. According to law, this patent has been expired therefore it can be utilized under Freedom to Operate mechanism. This invention is suitable to be implemented in Indonesia because it does not have much difference with currently used technology. The main difference is laid in chopping process of vanilla beans. This steps can be easily adopted by whether small farmer/industry or big industry as it can be done manually or automatically using machine. Another step that should be considered further is drying in a rotary forced air, hot water jacketed drier at about 140°F until reduced to about 35-40 % moisture by weight. This steps can be directly adopted by big industry, but it can be challenging for small farmer/industry because it needs a specific instrument. Nevertheless, this instrument can be replaced by other instrument that has the same purpose even it may cause different amount of time.

Patent document US 3352690 showed a slightly different technology used in vanilla bean curing. The green beans, either whole or cut in a manner so as to not destroy their identity, are subjected in an enclosed space to an atmosphere of high humidity and elevated temperature for a continuous period of time until enzymatic action and associated curing reactions have been substantially completed. Then the beans are dried in a separate step. The curing may be effected by placing the green beans on trays covered with a water vapor-impermeable covering, such as plastic sheeting. This invention deals with the curing of vanilla beans preparatory for extraction therefrom the vanilla produced during the curing operation. More specifically, it relates to a curing process wherein harvested green or partly cured vanilla beans are subjected to controlled conditions of temperature and humidity, whereby the drying operation is essentially separated from the curing operation until the manufacture of vanilla is substantially complete, after which the cured beans are dried. Separation of the two processes of curing and drying into two independent steps permits setting the most favorable conditions for each step of the process, thereby obtaining the optimum results. In the present invention, the harvested beans are first subjected to an atmosphere of high humidity and elevated temperature for a period of time wherein enzymatic action and associated chemical side reactions are substantially completed toward the formation of vanilla. Thereafter, the beans are subjected to a separate drying step.

During the curing step, the beans are subjected to the action of their own moisture vapor, in the substantial absence of liquid water contacting the body of beans. The curing step may be effected by placing the beans, loosely packed, in bags made of



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The 1st SATREPS Conference, Bogor Nov 14th, 2016

"The Project for Producing Biomass Energy and Material through Revegetation of Alang-alang (*Imperata cylindrica*) Fields"

substantially water-vapor impermeable material, such as plastic sheets of polyethylene, polyvinyl chloride, polystyrene, or the like. After the curing has been completed in the foregoing first step, the jackets are removed from the stacks, and the cured beans are now subjected immediately, and without limitations, to the second step wherein they are subjected to drying at lower humidity conditions at ambient or elevated temperature prior to packing. This differentiates strongly from the conventional methods wherein drying must be restricted because of its detrimental effect upon the curing process. The term green vanilla beans employed herein will be understood to include partially cured beans. From the aforesaid, it is apparent that the present invention eliminates a considerable amount of labor, as well as a considerable amount of time. The rate of enzymatic fermentation is accelerated rapidly so that the optimum curing is completed within a very short period. The process eliminates the possibility of developing mold, and gives an equal opportunity for beans of different sizes and maturities to reach the optimum cure. A product is thus produced which has a more uniform and better quality, and there is permitted the application of a rapid drying step prior to shipping. Indonesian vanilla industry can adopt this technology since this patent is already expired. This technology also does not need a lot of conformations from the already implemented technology. The main difference is the use of packing material. This material can be found easily in the market so that either small farmer/industry or big industry is able to apply this technology.

The more current technology in vanilla bean processing can be found in patent US 2011/0081448. This invention provided a process for preparation of cured vanilla bean pieces comprising steps of: i) blanching vanilla beans, ii) optionally cooling the blanched vanilla beans of step i), iii) comminuting the blanched vanilla beans of step i) or ii), iv) incubating the comminuted pieces of step iii), and v) drying the incubated pieces of step iv). Blanching is conducted preferably in water between 60-65°C for 2-3 minutes. Cooling may be achieved by any suitable means, preferably the beans are cooled by plunging into water between 12-15°C. After the blanching and optional cooling step, the beans are comminuted. "Comminuting" includes any manner for breaking one or more vanilla beans into smaller fragments, preferably the beans are chopped into longitudinal pieces in the average size is between 0.5 and 1 cm in length. Following comminuting, the vanilla bean pieces are incubated to allow developing of compound characteristic of vanilla. Incubation can be done by placing the beans in shallow layers on beds or trays. Preferably, a moving tray or bed be used. Alternatively, drum incubation maybe employed, whereby the comminuted beans are constantly rotated to achieve maximum aeration and uniformity. Preferably, the temperature of the beans is maintained at 30-50°C, the relative humidity of the atmosphere is between 65-75%. The layers of beans is mixed during incubation process to assist in bringing the enzymes into contact with the glucovanilin, and so speeds the process. The incubation can also be done through an anaerobic process. The anaerobic process is conducted under an atmosphere with an oxygen content of less than 0.1%, at a temperature between 45-60°C for between 48-72 hours. It has been found that under these conditions predominantly hydrolytic conversion of glucovanilin to vanillin occurs without the formation of brown pigments. In other embodiment, incubation comprises and aerobic steps and anaerobic steps. The anaerobic step is allowed to proceed until about 85% of the glucovanilin present in the bean pieces has been converted to vanillin. Subsequent to the anaerobic step, aerobic step is initiated. This can be achieved by the introduction of air into the incubation vessel. The separation of anaerobic step and aerobic step allows optimization of the formation of vanillin, together with control of the extent of the browning reaction and the profile of the flavor and aroma components thereby produced. After the incubation step, the beans are dried. Drying process can be

conducted by placing vanilla beans in ventilated oven with a circulating airflow at about 50°C. Dried vanilla beans can be a final product to launch to the market. However, it can also be material to produce vanilla extract. The three main extraction techniques currently employed are the percolation method, the oleoresin method, and extraction with liquid carbon dioxide. This patent has not expired yet, but it is not registered in Indonesia. So, the technology can be implemented in Indonesia without violating the law.

Based on those searching results of vanilla bean processing, patent documents have a lot to offer in term of increasing added value of vanilla bean in Indonesia by improving vanilla bean processing, mainly drying and curing process. The most advanced technology is the latest one disclosed in patent US 2011/0081448. It can be adopted in Indonesia with some modification. Some steps that can be adopted are chopping vanilla bean prior to next step, blanching vanilla bean with warm water, cooling vanilla bean with cold water, separating anaerobic and aerobic step incubation, mixing vanilla beans during incubation process, and drying vanilla beans in certain temperature.

3.2. Processed Product of Vanilla Bean

The most widely used product of vanilla bean is vanilla extract. Vanilla extract is used in food industry, pharmaceutical industry, and cosmetic industry. In Indonesia, production of vanilla extract is still far below dried vanilla bean, even though vanilla extract has higher value. Searching result in some websites and software showed 100-200 patent documents related to vanilla extract. There are some vanilla extract technologies that can be adopted in Indonesia.

Patent US 2835591 filed in 1955 disclosed method of producing cured vanilla extract from green vanilla beans through the following steps. First step is chopping mature vanilla beans in an oxygen-free atmosphere. Next step is contemplating extracting the green bean extract from the chopped beans by adding sufficient amount of water to chopped vanilla beans, agitating the mixture, pressing the mixture through a filter medium on which the bulk of the bean fibrous material is retained and the filtrate is reserved representing the first green bean extract. Then additional extraction is carried out by washing the fibrous material retained in the filter medium by thoroughly mixing the same with water as in the initial extraction. The mixture is then filtered through the same filter used for the first extract. This additional extracting step can be repeated as needed. The various filtrates are then combined with the initial filtrate for immediate curing. Green vanilla extract bean can be concentrated prior to curing. During curing, one or more enzyme systems, as for example pectinolytic, diastatic, proteolytic, glycosidase, and catalase can be added to the green vanilla bean concentrate. Final curing step and achievement of cured vanilla extract is carried through these steps. First, green bean concentrate is spread as a liquid film on metal or glass trays. The trays are placed in a vacuum oven where they are subjected to heat at 60-90°C. This process is preferably carried out for a period of 5-10 hours. Following curing, dry residue is scraped from the trays and combined with ethyl alcohol and water to produce a final cured extract. This patent has already expired so it can be adopted under FTO mechanism. However, this technology may be too complicated and not efficient to be applied in Indonesia since it needs various equipment to be added to currently used tools in Indonesian vanilla industry.

Other document discloses technology of vanilla extract production is WO 1993025088. The invention relates to method for obtaining a natural flavour of vanilla, which comprises bringing vanilla beans in contact with enzymes of the pectinase,



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2017



The 1st SATREPS Conference, Bogor Nov 14th, 2016

"The Project for Producing Biomass Energy and Material through Revegetation of Alang-alang (*Imperata cylindrica*) Fields"

cellulase and/or hemicellulase type, and making a β -glucosidase enzyme react, and extracting the natural vanilla flavour thus obtained. Before any enzyme treatment is brought, vanilla pods have undergone prior grinding, macerated in the presence of water. The grinding may also be performed in the presence of water in which the pods are then left to macerate. This maceration is intended to facilitate subsequent enzymatic actions. Indeed, besides its hydration function of vanilla beans cells to make them more accessible to enzymes, it enables the solubilization of glycosides in these cells which are, as such glucovanillin, substrates of β -glucosidase. Incidentally, maceration also has a tenderizing role in the consistency of vanilla still facilitating enzymatic action. The conjugates of the maceration roles thus allow enzymatic attack more homogeneous and complete. The enzyme preparations are then added to vanilla beans macerated in an amount of from 26 to 1820 units PGU and preferably 100-1300 PGU units pectinase type enzyme, cellulase and / or hemicellulase per gram of dry vanilla pod, and from 10 to 700 units and preferably from 50 to 500 β -glucosidase units per gram of dry vanilla pod. A PGU unit corresponds to the amount of enzyme required to reduce the viscosity of a standard solution of polygalacturonic acid at 20°C, at pH 3 and 30 minutes. A β -glucosidase unit is defined as the number of micromoles of glucose produced in one minute, at 65°C and pH 5.5 from a solution of β -glucosides barley. After the enzymatic treatment, the reaction medium is diluted 1'ethanol (30 to 50% v / v final) to stop any enzymatic reaction and to better solubilize 1 flavor and vanillin. This infusion was then followed by filtration or centrifugation; the filtrate or supernatant, depending on the case, constituting the flavoring preparation of vanilla. This patent is filed in 1993 so it has been expired and is available to be utilized. The key components in this technology are enzymes. If industry can access these enzymes, this technology can be adopted in Indonesia.

The more current patent document discloses technology of vanilla extract production is US 5705205. This invention is related to a process for increasing the yield of natural vanilla flavor. Green vanilla pods are hydrated, then hydrated pods are ground, forming a liquid phase and a solid phase. The resulting ground hydrated product of green vanilla pods is treated with enzymatic system including at least one enzyme. The enzyme system possesses from about 10 to about 100 units of beta-glucose activity per gram of green vanilla pods. The ground hydrated vanilla pods and the enzymatic system are incubated at a temperature of from about 10°C to about 40°C for a period of between about 2 hours and about 30 hours sufficient to allow the release of the vanilla flavor. The incubation with the enzyme is carried out at the natural pH of the ground product obtained, that is to say at a pH of about 5, with stirring. The liquid phase containing the vanilla flavor is separated from the solid phase. This separation may be carried out by filtration and/or by centrifugation. The liquid phase containing the natural vanilla flavor may then be used either directly or after concentration of the flavor extract. This concentration may be carried out by evaporation, optionally under vacuum, and then filtration. It may also be carried out by extraction with solvent and subsequent evaporation of the latter. This patent was filed in 1996 in US, so it can be utilized in Indonesia. The technology disclosed in this patent is easier to apply than the previous technology. This technology has some simple steps that can be followed by industries even the small ones.

According to searching results, vanilla extract commonly produced by enzymatic reaction. The difference can be the kind of enzymes, incubation parameter, and extraction technique. Patent US 5705205 is potential to be adopted in Indonesia because it has simple steps and can be modified as needed.



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3.3. Spent Vanilla Processing

Spent vanilla pod is a resource that is still minimally utilized. However, it can be processed into high value product to increase its added value. There are some patent documents disclosed technology for spent vanilla processing according to searching results. Patent US 007803412 relates to a process for obtaining flavor components from spent vanilla pods and beans, comprises forming a mixture of such spent pods and beans, incubating the mixture with an enzyme capable of destroying the cell membrane systems of said pods and beans for period of time and at a pH and temperature such that said cell membranes break down and release flavor constituents, and thereafter recovering the flavor constituents from mixture. The spent vanilla beans are ground and hydrated in water. Spent vanilla pods are present in the amount of between 5 to 50% of the water added. The spent vanilla pods are treated with an enzymatic system which comprises: at least one enzyme capable of destroying the cell membrane systems of plant cells and is selected from the group consisting of an enzyme having hydrolase activity, such as pectinase activity, an enzyme having cellulase activity, an enzyme having hemicellulase activity, an enzyme having protease activity, an enzyme having lipase activity, and an enzyme having [3-glucosidase activity, an enzyme having oxidoreductase activity or an enzyme having transferase activity. The enzymatic system comprises 40-400 units of enzymatic activity per gram of spent vanilla pods.

The enzymatic reaction is carried out at a pH between about 3 and 10, and preferably at the optimum pH for each individual enzyme system. As the pH of the ground, spent vanilla pods product obtained is approximately equal to 5, this ground product is therefore naturally at the optimal value for enzymes such as cellulases, pectinases, hemicellulases, and 3-glucosidases. Enzyme systems containing lipases, proteases, esterases, oxidoreductases and transferases require a pH that is optimal for each enzyme system. The process is carried out with stirring for a period of time sufficient to allow the degradation and modification of the spent vanilla pods and the release of the natural flavor components. Advantageously, this period will be greater than 2 hours at room temperature, preferably between about 30 and 40°C.

After incubation, the liquid phase containing the vanilla flavor is separated from the solid phase, which contains especially insoluble cell residues. This separation maybe carried out, for example, by filtration and/or by centrifugation. The liquid phase containing natural flavor compounds and food modifiers may then be used, either directly or after concentration of the compounds. Such concentration may be carried out by evaporation, selective chromatography, optionally under vacuum, and then filtration. It may also be carried out by extraction with solvents and subsequent evaporation of the latter. This patent was filed in 2006 and was granted in 2010, but it is not registered in Indonesia so it can be adopted by vanilla industry in Indonesia. Complexity in this technology is lies on the various enzyme used in incubation process. If industry could afford the enzyme, this technology can be applied well.

Other technology relates to spent vanilla processing is US 2011/0318805. This patent discloses a process for producing flavor constituents from spent vanilla materials, comprising treating the material with microorganism such as bacteria, fungi and yeast, that produce enzymes having the ability to degrade the plant cells systems of the material such as hydrolase, pectinase, cellulose, xylanase, lipase. esterase, and protease, and recovering the flavor constituents so produced. First, the spent vanilla pods are ground then they are hydrated to form a ground, hydrated product having a liquid phase and a solid phase. The next process step is treating the ground, hydrated product with microorganism having the capacity to produce at least one enzyme capable of degrading the plant cells or transforming the flavor precursors. The microorganisms is selected



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2017



The 1st SATREPS Conference, Bogor Nov 14th, 2016

"The Project for Producing Biomass Energy and Material through Revegetation of Alang-alang (*Imperata cylindrica*) Fields"

from the group consisting of bacteria, fungi, and yeast and mixture thereof, such as *Aspergillus niger*, *Bacillus*, *E. coli*, *Streptomyces*, *Thermomyces*, *Trichoderma*, *Mucor*, etc. The subdivided, hydrated product containing the microbial system is incubated at general conditions of temperature that will vary, but will generally be that sufficient to promote microbial growth. The incubation is typically carried out without pH adjustment as natural pH was around 5. The slurry is agitated while incubated at 10-40°C for 2-48 hours. At the end of reaction the mixture is mixed with alcohol to obtain a 50% (v/v) aqueous solution. Thereafter the liquid phase is separated from the solid phase of the mixture, and the liquid phase that contains the natural flavor extracts together with other soluble material is recovered. Within these extracts and material further precursors to other flavors can be present. Some of these flavor compounds can modify. This patent was not registered in Indonesia, so that it can be adopted by vanilla industry. The use of microorganism opens opportunity to do some modifications because Indonesia is rich in microorganism diversity. However, incubation process may need some specific equipment to assure fermentation process is done well.

Other technology that can be adopted in Indonesia is patent EP 2430925. This patent was filed in 2010, but it is not registered in Indonesia. So, it can be applied in Indonesia. This invention relates to process for obtaining flavor constituents from spent vanilla and marks. The vanilla materials are ground to increase their exposure to enzyme activity, after which an aqueous mixture of the ground materials is formed. The mixture is agitated to form a slurry consisting of liquid and solid phase and the slurry treated with a microorganism selected from the group consisting of bacteria and yeast and having the ability to produce an enzyme capable of degrading the plant cell system of the material for a period of time and that a pH and temperature such that the said cell system break down and release their flavor constituents. The enzyme is selected from a group consisting of hydrolases, pectinases (polygalacturonase; EC 3.2.1.15), cellulases (1,4-[1,3;1,4]- β -D-glucan-4-glucanohydrolase; EC 3.2.1.4), β -glucosidases, proteases (EC 3.4.23), hemicellulases (glycan hydrolase E.C. 3.2.1.), xylanase (1,4- β -D-xylanxylanohydrolase; EC 3.2.1.8), lipases (triacylglycerol lipase EC 3.1.1.3), esterases (E.C.3.1.), proteases (E.C.3.4.), oxidoreductases (EC 1.1.- EC 1.11), and transferases (E.C.2.). These enzymes may be used alone or in a mixture. The enzyme so utilized or microbially produced is present in an amount of about 10 to about 1000 units per gram of spent vanilla product, preferably from 20 to 500 units of enzymatic activity. The enzymatic reaction is carried out at a pH which is advantageously between about 3 and 10, and preferably at the optimum pH for each individual enzyme system. As the pH of the ground, spent vanilla pods product obtained is approximately equal to 5, this ground product is therefore naturally at the optimal value for enzymes such as cellulases, pectinases, hemicellulases, and β -glucosidases.

The process is carried out with stirring for a period of time sufficient to allow the degradation and modification of the spent vanilla pods and the release of the natural flavor components. Advantageously, this period will be greater than 2 hours at room temperature. The temperature will be preferably between about 30 and 40 degrees C. After incubation, the liquid phase containing the vanilla flavor is separated from the solid phase, which contains especially insoluble cell residues. This separation may be carried out, for example, by filtration and/or by centrifugation. The liquid phase containing the natural flavor compounds and food modifiers may then be used, either directly or after concentration of the compounds. Such concentration may be carried out by evaporation, selective chromatography, optionally under vacuum, and then filtration. It may also be carried out by extraction with solvents and subsequent evaporation of the latter. This invention sums up technologies from prior invention, in which microorganisms and enzymes are used to treating spent vanilla.



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Therefore, this technology is possible to be applied in Indonesia.

4. Conclusion

Increasing added value of vanilla bean can be achieved through multiple ways such as optimizing curing and drying process of vanilla bean, processing vanilla bean into processed product, and utilizing spent vanilla to produce high value product. Optimizing curing and drying process can be done through chopping vanilla bean prior to next process, separating aerobic and anaerobic incubation, and drying vanilla bean in certain and controlled temperature. Production of processed vanilla bean can be carried out by enzymatic process as disclosed in patent 5705205. And spent vanilla processing can be done using microorganism or enzyme as degrading agent to produce flavor components.

5. Acknowledgement

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